TEK-AT4L
486SX/DX/DX2 SINGLE-BOARD COMPUTER
HARDWARE REFERENCE MANUAL
VERSION 1.1, JULY 1993

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FOREWORD

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This manual does not discuss standard features of the IBM family of Personal Computers. Instead, it focuses on the superset of features that TEKNOR has implemented into its single board computers.

For information on IBM standard features, please refer to the following books available at your local book stores:

- *IBM AT Technical Reference Manual*
- *DOS Technical Reference*
- *Peter Norton's Programming The IBM PC*

This is by no means an exhaustive list. Many titles exist on these subjects and just as many titles deal with specialized applications such as extended memory transfers, disk drives, ems, and so on.

If you require information not covered in this manual or in our Application Notes releases, contact our Technical Support/Services Department at (514) 437-5682.

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INTRODUCTION SECTION 1

The TEK-AT4L is a high performance PC/AT type computer on a single-slot card format (13.3" x 4.7"). It integrates all the basic functions available on standard IBM AT computers like a hard disk interface and floppy disk controller.

Best of all, the TEK-AT4L is designed to operate in environments where a sturdy and compact system is essential. So elements such as a watchdog timer, solid state disks, and a power failure detector were added to make the TEK-AT4L perform even in the most extreme industrial applications.

Built using CMOS technology, the TEK-AT4L consumes very little power. For example, the 33Mhz TEK-AT4L typically consumes less than 7.5 watts.

And the TEK-AT4L is versatile, too. It can be installed in a PC passive backplane or, because of its small size, it can be used as a stand-alone controller by utilizing the four standard mounting holes and separate power connector.

To top it off, a 93-pin, AT expansion header accommodates TEKNOR's series of mezzanine display controllers or other optional expansion cards.
Here are more exciting features found on the TEK-AT4L single board computer:

- PC/AT bus or stand alone
- AT keyboard and speaker port

operation
• 486SX @ 25Mhz
486DX @ 33Mhz
486DX2 @ 66Mhz
• 1, 4, 8, 16, or 32MB of system memory with mixed DRAM support
• 4MB of user EPROM or Flash EPROM
• Up to 2MB user SRAM with battery backup
• Supports Shadow RAM BIOS for fast execution
• Flash EPROM boot
• Real-time clock with battery backup
• One parallel printer port (LPT1)
• Two serial ports with COM2 as RS232 or RS485
• Watchdog Timer
• Power Fail Detector
• Low Battery Circuit Detector
• Onboard floppy controller: drives two floppies
• Onboard IDE hard disk interface
• Sleep Mode support
• CMOS technology for low power
• Two year warranty

UNPACKING

If the TEK-AT4L appears to be damaged, please notify Teknor immediately. Save the box and packing material in case you need to ship the card back in the future.

The TEK-AT4L package is comprised of the card itself, a keyboard cable, a 3.5" floppy disk containing the utilities, this hardware reference manual, and a software utility manual. The TEK-AT4L is preconfigured at the factory to operate as a standard IBM AT processor card.

BASIC MODES OF OPERATION

The TEK-AT4L single board computer is an exceptionally versatile board that will function either on a passive backplane or as a stand-alone controller. In fact, it is a real performer in true industrial applications functioning without disks, keyboard and monitor.

Following is a brief description of the operating modes available on the TEK-AT4L.

Passive Backplane

The TEK-AT4L can be used in a PC/AT Passive Backplane in conjunction with any PC/AT and XT compatible cards. Power is drawn directly from the PC Bus. Video cards may be used but are not a prerequisite for operation.

☞ **To avoid damage, make certain the power is off before inserting or retrieving a card from the passive backplane.**

User Interface
The TEK-AT4L operates with any PC Bus compatible display card. Or, if stand-alone mode is desired, a TEKNOR Mezzanine SVGA card may be used.

A VT100 terminal (or a PC emulating VT100) may be used as an inexpensive alternative to a display and keyboard. Refer to Section 5, *Using VT1OO Mode* for more details on this procedure.

Stand-Alone Operation
An alternate power connector is available for supplying the necessary voltages to the TEK-AT4L board. This is useful in situations where a Passive Backplane system is not appropriate.

In fact, by utilizing a TEKNOR Mezzanine card, you can assemble a complete computer in a 13.3x4.7x1.25" area - without ever using a passive backplane system at all.

And when your applications call for it, the TEK-AT4L is fully operational without any user 0interfaces at all - able to run without disks, keyboard, and video.

Diskless Operation

The TEK-AT4L can operate without mechanical drives in any basic mode of operation. A Flash disk can be configured as a bootable disk and temporary data may be securely stored on SRAM disks.

In essence, the TEK-AT4L is an ideal industrial controller withstanding shock, vibration, and temperature variations - all major concerns in industrial environments.

JUMPERS

The TEK-AT4L is designed to allow for minimal hardware configuration. The following is a list of the basic configuration jumpers available on the TEK-AT4L.

Jumper	State[1]	Function
COM2 Configuration		
	RS232	*RS485*
W1	*(1-2)**	*(2-3)*
W2	*(1-2)**	*(2-3)*
W3	*Open**	*Closed*
W4	*Open**	*Closed*
W5	*(1-2)**	*(2-3)*
W6	*(1-2)**	*(2-3)*
Power Detection Circuitry		
W7	*(1-2)**	*Power Fail Detection*
W7	*(2-3)*	*Low Battery Detection*
SRAM Memory Type		
*W8(1-2)**	*32Kx8, 128Kx8 Devices*	
W8(2-3)	*256Kx8, 512Kx8 Devices*	

[1] * as shipped

Flash EPROM Type

*W9(1-2)**	*28F010, 28F020 Devices Only*
W9(2-3)	*29F040 Devices Only*[2]

SRAM Battery Backup

W10	*Open* No Batt*
	Closed Vbatt

Hard Disk Interface

W11	*Open* Enable*
	Closed Disable

Watchdog Timer

W12	*Open*	*Disable*
	*Closed**	*Enable*

Power Monitoring

W13	*Open* Disable*
	Closed Enable

Flash EPROM

W14	*Open*	*No Flash*
	*Closed**	*Flash Installed*

BIOS Boot Flash[3]

W15	*Open* EPROM BIOS*
	Closed Flash BIOS

Teknor BIOS Extension

[2] **Devices expected to be available 4Q93**

[3] **Not yet supported.**

W16	*Open**	*Enable*
	Closed	*Disable*

CPU Type[4]

	486SX	*486DX/DX2*	*OPR486*
W17	*Open*	*Closed*	*Closed*
W18	*(1-2)*	*(2-3)*	*(2-3)*
W19	*Open*	*(1-2)*	*(2-3)*

PS/2 MOUSE

W19A	*Open**	*Disable*
	Closed	*Enable*

BUSCLK[5]

W20	*CPUCLK*	*ASYNC*	*CPUCLK*
	25Mhz	*16Mhz*	*33Mhz*
	1-2	*2-3*	*Open*

[4] *Factory configured.*

[5] *SYSCLK can be setup to boot 25Mhz or 33Mhz boards (Synchronous mode) or either (Asynchronous mode). However, when set to Asynchronous mode the boot process is much slower. Moreover, regardless of the CPU speed setting, the SYSCLK will always be at 8Mhz after the boot up process.*

***CPU Speed*[4]**

	25Mhz	*33Mhz*	*50/66Mhz*
W21(1-2) S0	*Closed*	*Open*	*Clos/Open*
W21(3-4) S1	*Closed*	*Closed*	*Closed*
W21(5-6) S2	*Closed*	*Closed*	*Closed*

Graphics

W22	*Open**	*Mono, EGA, VGA*
	Closed	*Color CGA Only*

Boot From Flash EPROM

SW1(1-2)	*Open**	*Boot From Drives*
	Closed	*Boot From Flash*

COM1/COM2 Select for VT100 or Remote Download

SW1(3-4)	*Open*	*Use COM1**
	Closed	*Use COM2*

Console is VT100

SW1(5-6)	*Open**	*Standard Display Mode*
	Closed	*VT100 Mode*

Remote Download

SW1(7-8)	*Open**	*Normal*
	Closed	*Remote Download*